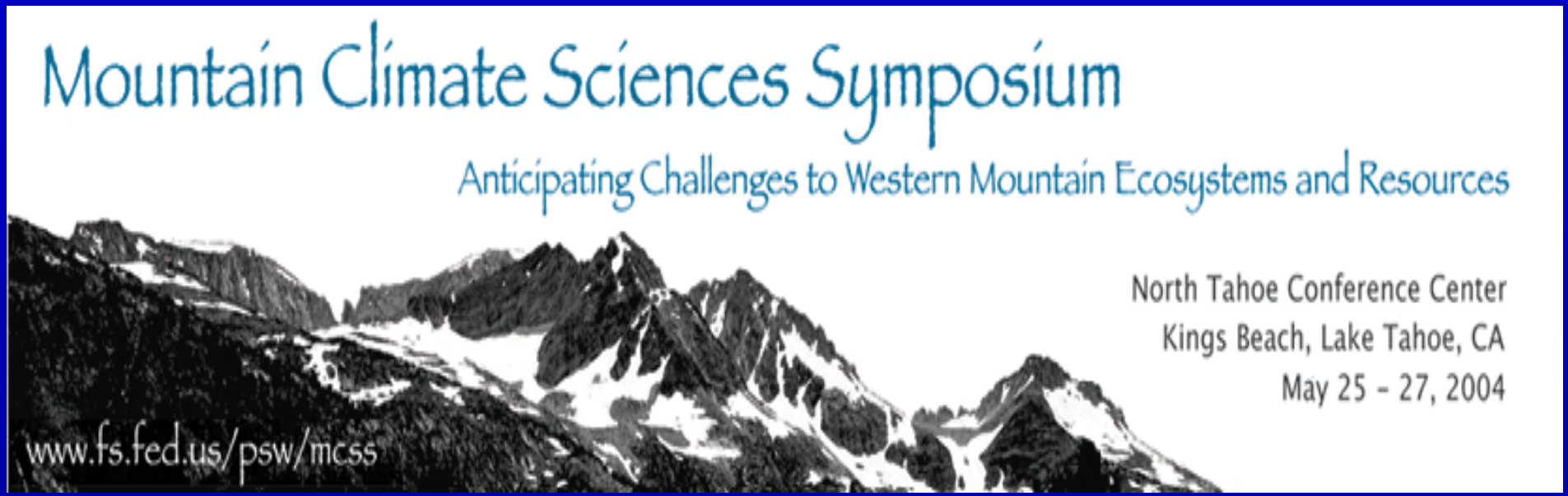
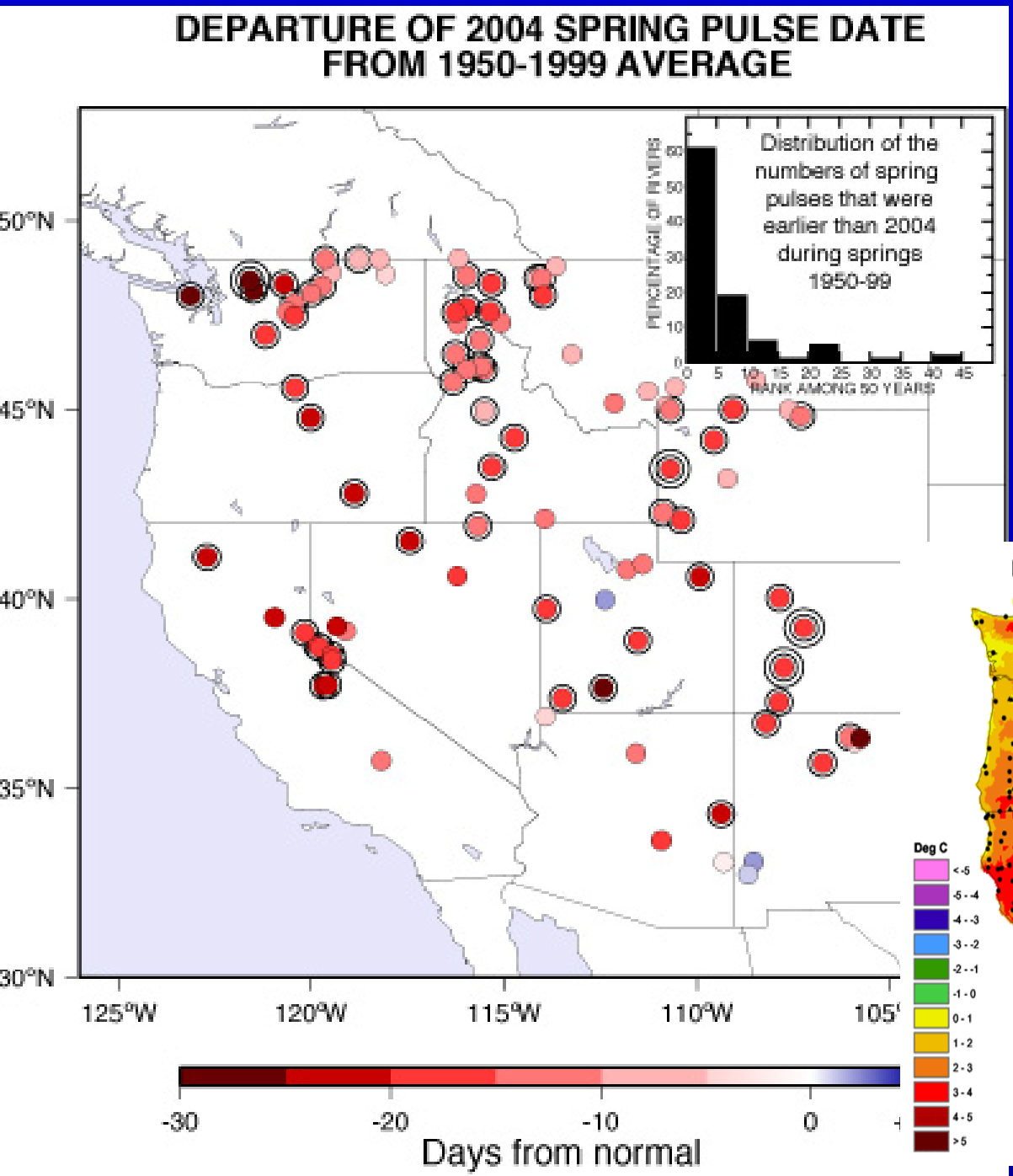
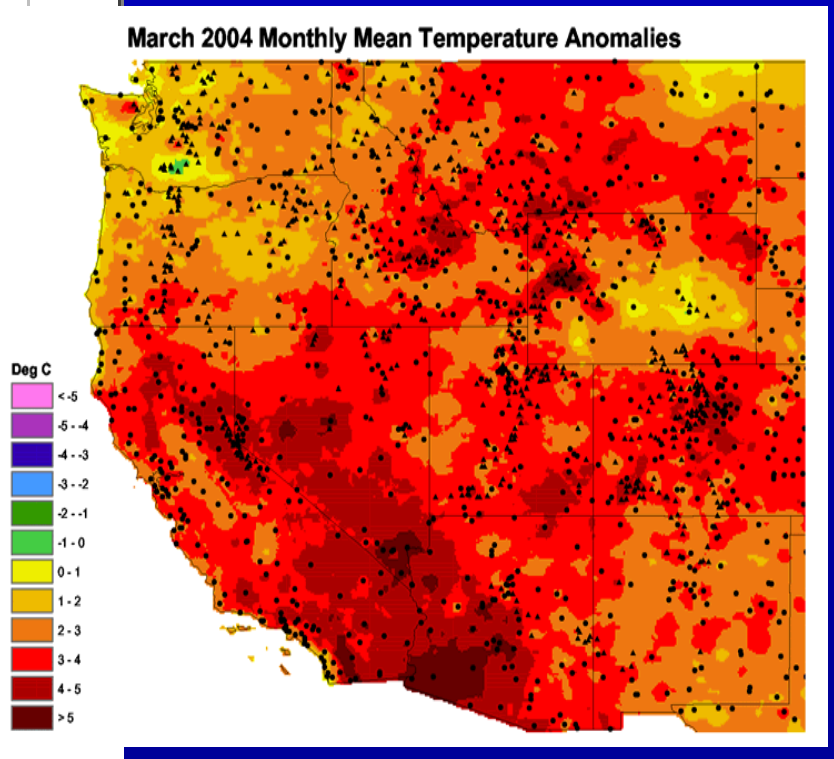
# "Mountain regions are uniquely sensitive to changes in climate "




**At the recent Mountain Climate Sciences Symposium, participants underscored that *climate system monitoring*—including the biosphere, hydrosphere and cryospheric was at the top of the priority list for sustainable management of western resources, in light of predicted future climate conditions under an enhanced greenhouse effect.**

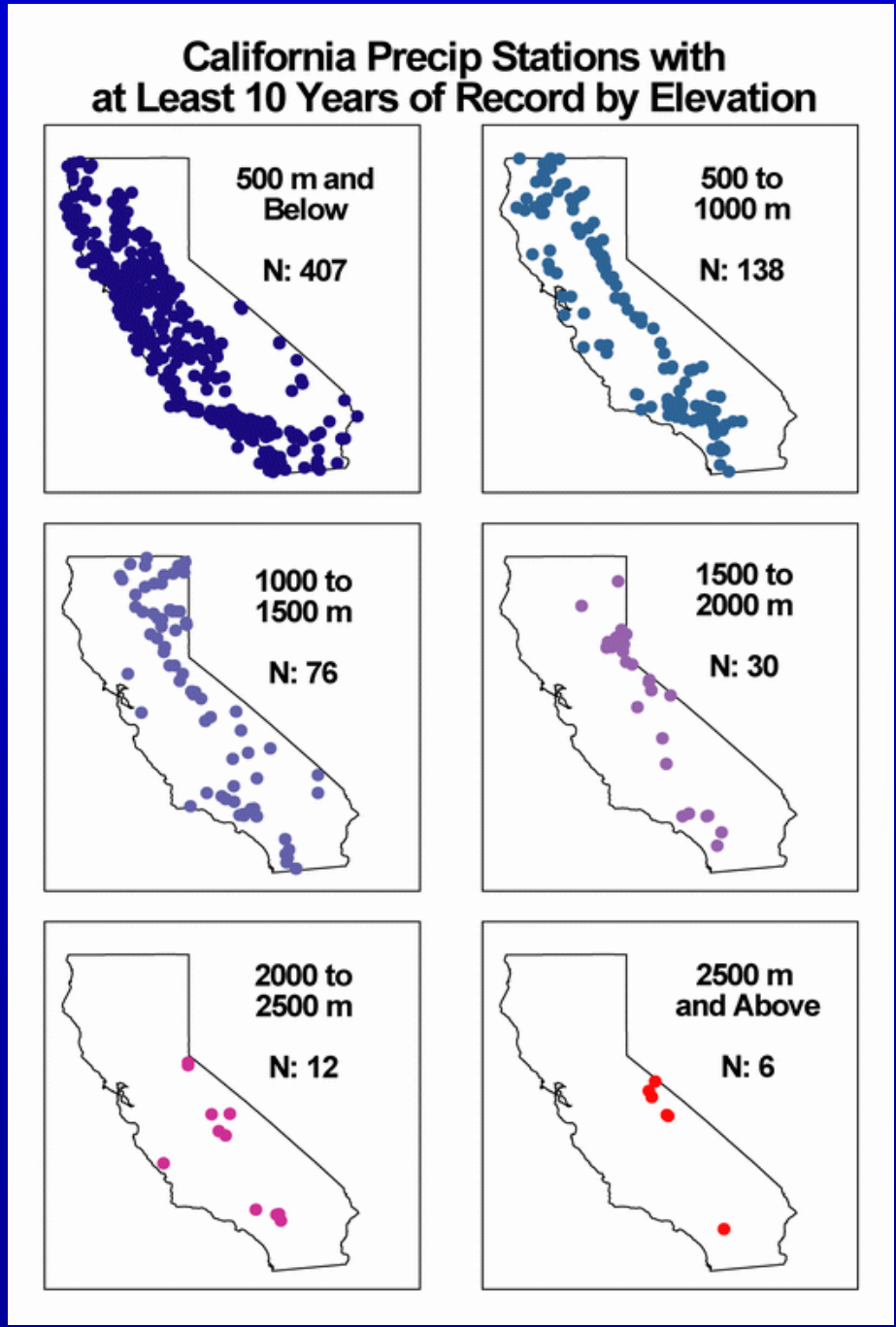



# Mar-Apr 2004 a remarkably warm and early spring

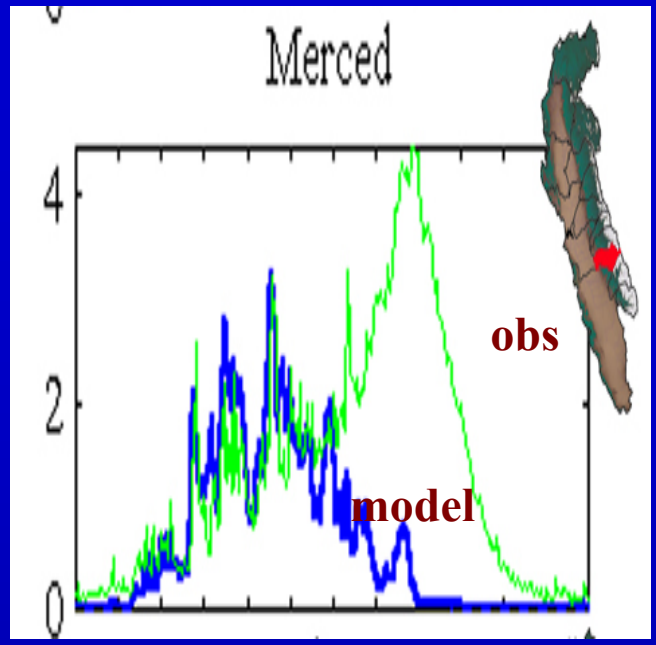


# High elevation climate stations are very sparse!

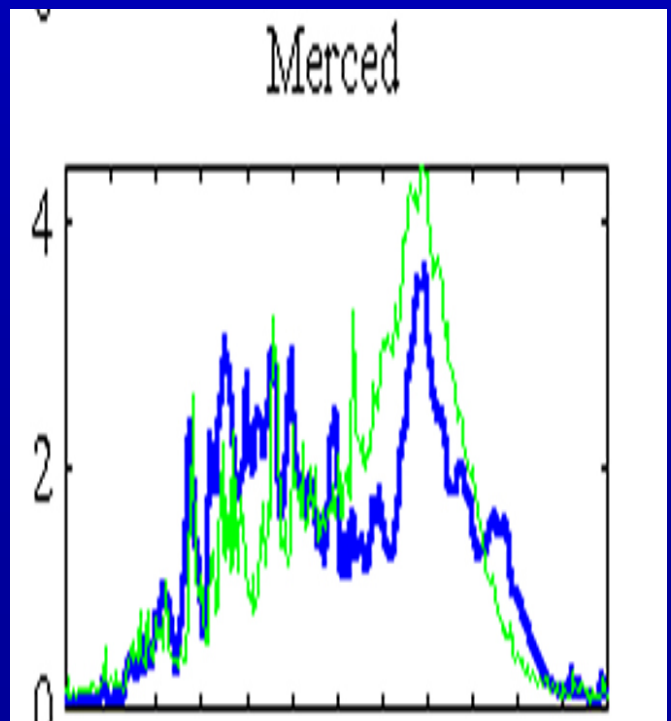
Most of California's precip (and temp) gauges are sited in low elevation population centers. Yet, a lot of our concern is for climate changes in mid-high elevations.



temp estimated from linear lapse rate high elevations extrapolated from low elevn obs *doesn't work*

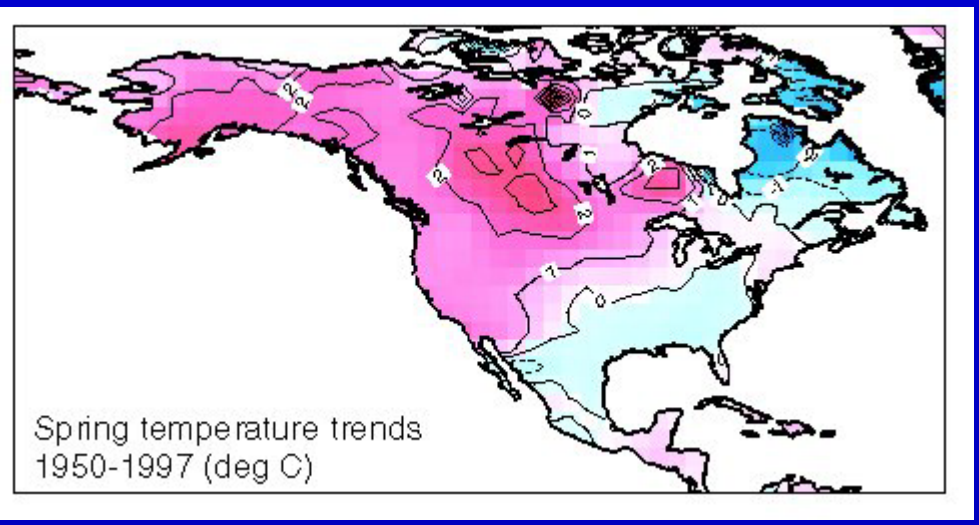



steeper lapse rate, high elevations (cooler) *Perfoms better*

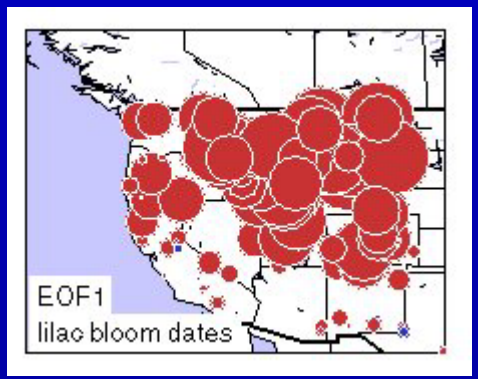


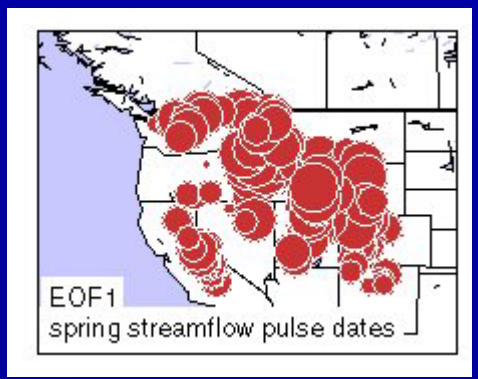

# California's present network of low elevation observations are inadequate to describe snow accumulation and snow melt in Sierra Nevada

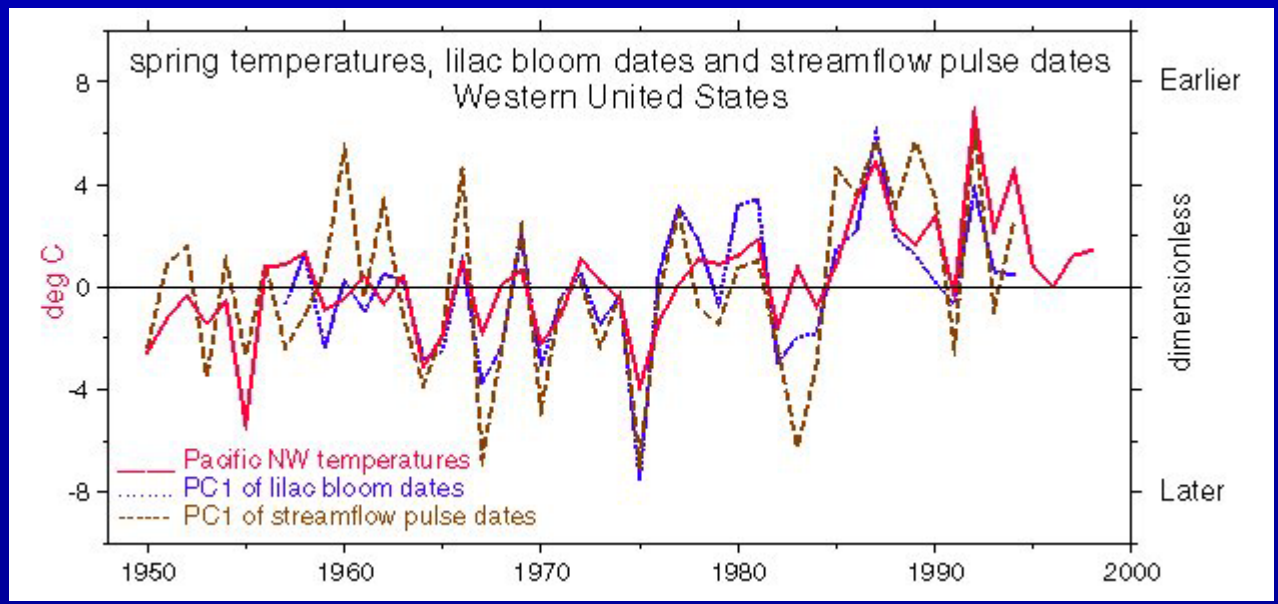
Courtesy of Noah Knowles



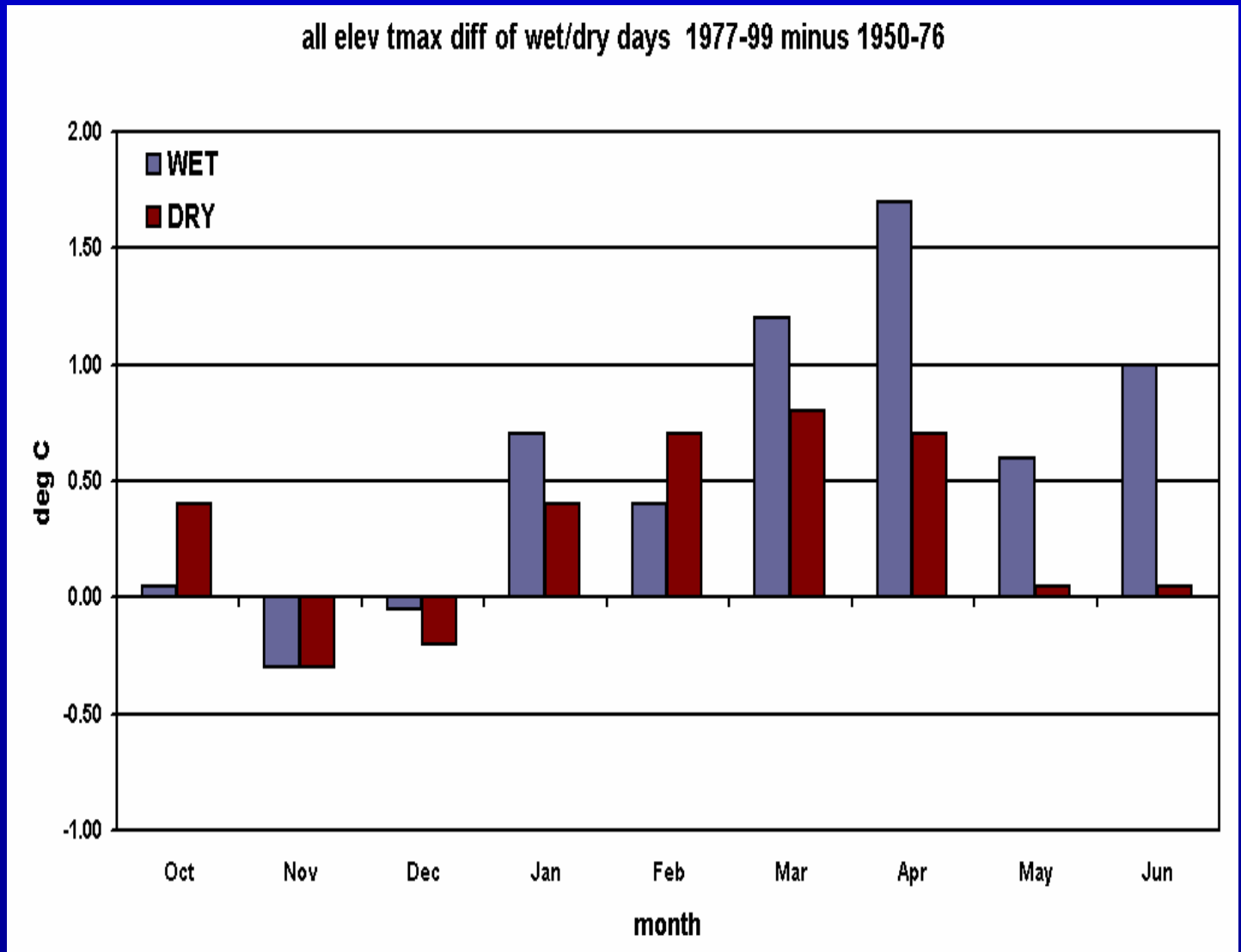

# The Western North America warming by 1-3dgC since 1950 has given earlier snowmelt and spring ecosystem responses

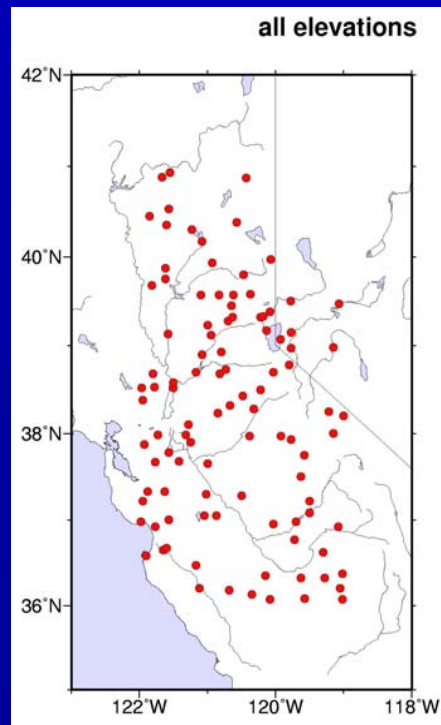


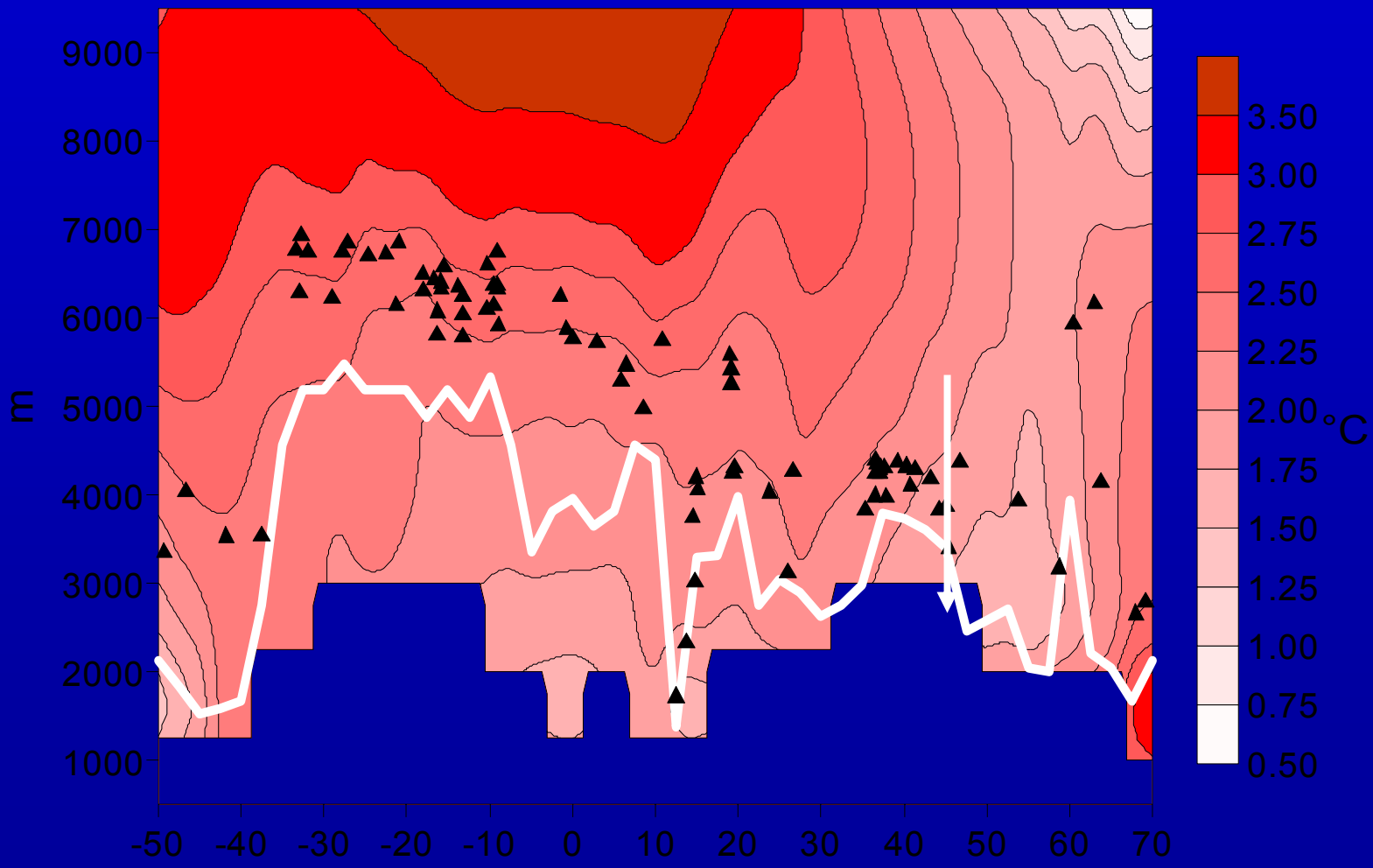



# Warmer storms and interstorm periods
## *but how has warming occurred over high elevations?*



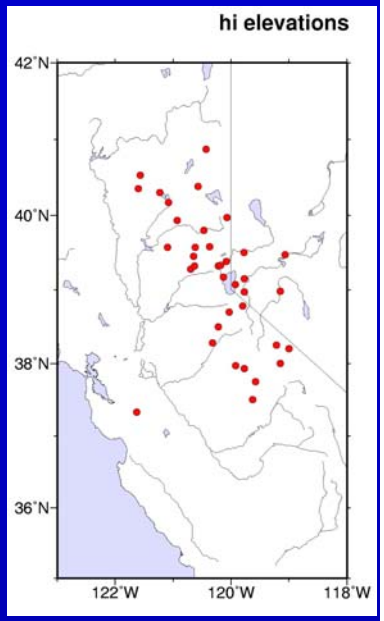



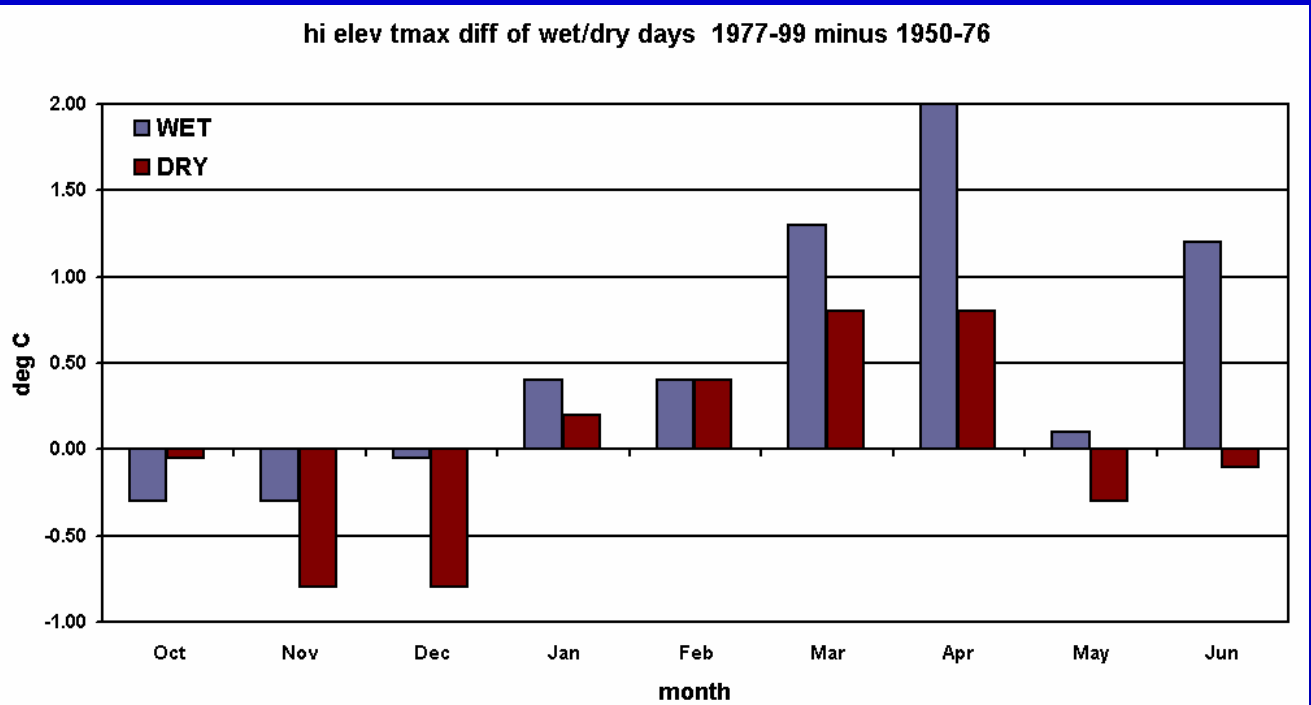
# Climate warming Dec, Jan Feb
# 7 modern climate models 2XCO2 over American cordillera

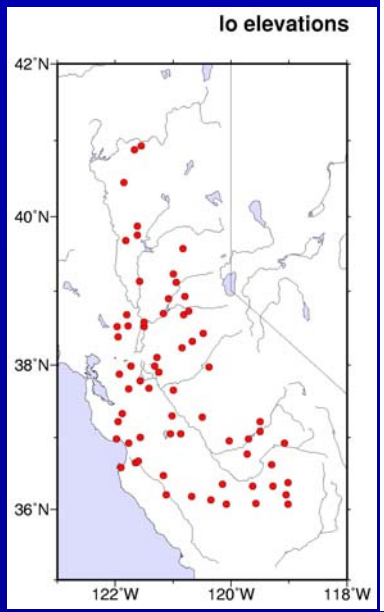



courtesy Ray Bradley, Henry Diaz

***We need transects of weather and hydrological monitoring stations to survey processes and changes in mountain zones***


hi elevations
42°N
40°N
38°N
36°N
122°W
120°W
118°W


hi elev tmax diff of wet/dry days 1977-99 minus 1950-76
WET
DRY
deg C
2.00
1.50
1.00
0.50
0.00
-0.50
-1.00
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
month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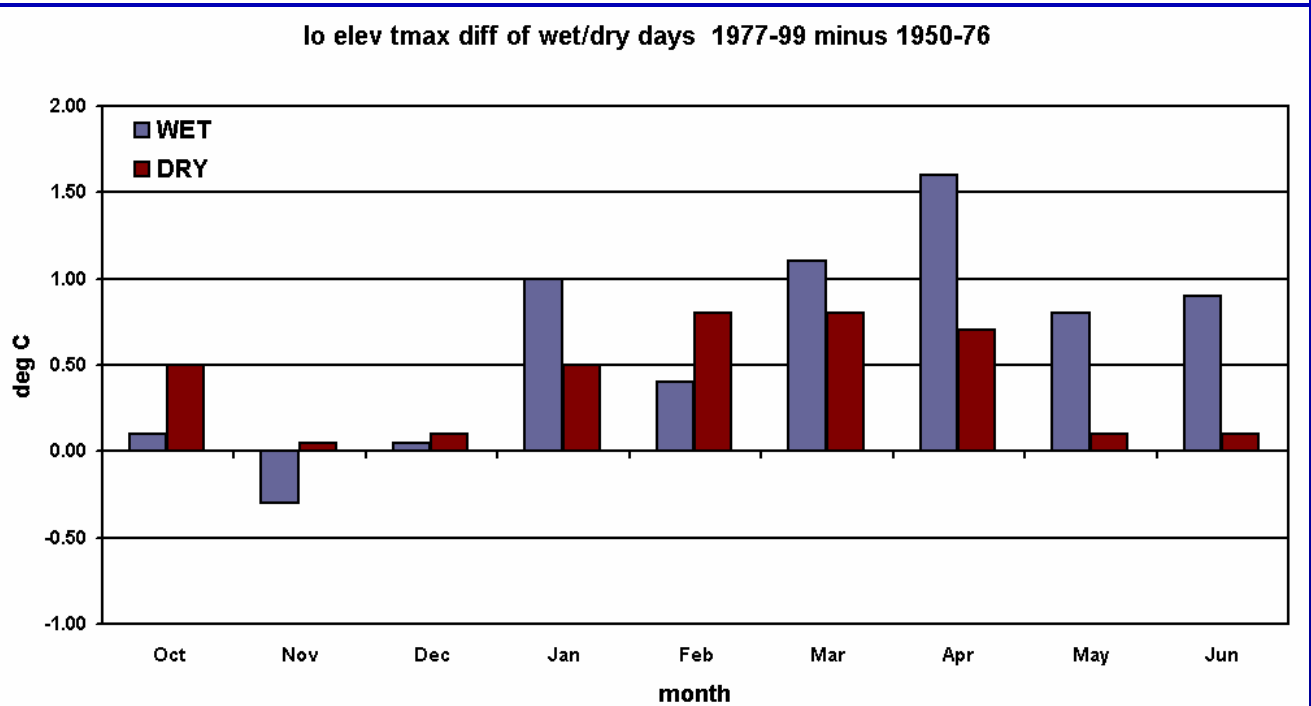
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